The Northwestern MILLER

MILLING PRODUCTION SECTION

Water Cooling of Grinding Rolls

By Fred Schumacher

There is an influential school of thought within the milling industry, both in North America and overseas, which considers the water cooling of rolls to be of paramount importance, particularly for short roll surfaces and in hot climates. The roll temperature, protagonists claim, is reduced and kept constant. Low roll temperature means cooler grinding and constant temperature insures unchanged setting of the rolls and more uniform results. Fred Schumacher is a member of the staff of the Buhler Mill Engineering Co., with headquarters in Minneapolis. His experience in the milling business extends over a period of 30 years, and 10 of those years have been spent in the U.S. Prior to his U.S. experience he worked in Switzerland, Yugoslavia and Germany.

THE maintenance of low temperatures during the grinding process has been an existing problem ever since grain has been ground. We know that in the grinding operation, considerable heat is generated and if this heat is not removed, sweating will take place in the roller mills, resulting in condensation which will prevent the successful operation of the mill.

The source of heat in the stock is the power applied in driving the rolls and other machines in the mill. Although we say power is consumed in grinding, a great part of the power used to run the mill is converted into heat. Every day, every hour, grinding conditions change because the atmospheric conditions change. We can see this from the extraction figures which are different each day. Should the aim be insured, much care must be exercised for uniform, tempered grinding. This is not so simple to attain. It is not easy to maintain uniform temperatures for the entire mill with all the machinery. Air comes from outside into the mill; the aspiration pushes the humid air outside of the mill as the air changes day and night—in winter, low (below zero); in summer, high (above zero).

The cooling of the stock can be attained in several ways:

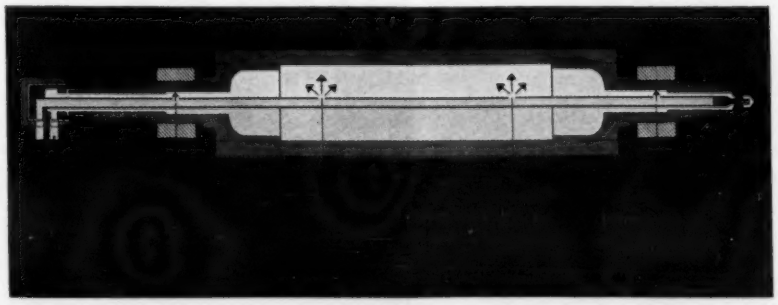
1. **By evaporation;**
2. **By removal of the heat by air;**
3. **By direct transfer of heat to cold surfaces by conduction.**

The general method used for removal of heat is a combination of 1 and 2. The fact is that in order to evaporate water or other liquid, heat must be applied. This heat, unless it is not furnished from outside, will be taken from the body containing the water by creating a pressure difference. Dry air will extract water from the humid stock and this again, in order to become steam vapor, extracts heat from the stock in order to evaporate the extracted water. Consequently, a drying of stock takes place.

The above moisture extraction and cooling effect depends upon the surface of the stock coming into contact with the air. The extraction depends also upon the state of saturation and temperature of the air. A cubic foot of air can absorb only a definite amount of vapor before reaching saturation.

Another possibility for removing heat is that the heat is taken up by the surrounding air which naturally will warm up. All elements in their various physical states, in order to change their temperature, must expel or absorb heat. The amount of heat required to change the temperature is different for each element and for its physical state. The required amount of heat to change 1 pound of matter for 1° F. is called "the specific heat." The specific heat of air is 0.24; for water, 1; for saturated steam, 0.5. This means that to heat 1 lb. of water 1° F., we need four times the amount of heat as for air. Consequently, 1 lb. of water can store four times the amount of heat that 1 lb. of air can store.

The third possibility for the removal of heat consists in the contact of the mill stock with cold surfaces, whereby heat is extracted. This requires that the stock contact the cooling surfaces in a thin layer and that the cooling surface be made of a material with a good conductivity. Grinding rolls have surfaces well suited, they are in close contact with the stock and have a good heat conductivity.



A B D C C D

Sectional drawing of a roll with water cooling
A—Water inlet. B—Water outlet. C—Cooling water outlet within the roll. D—Cooling water outlet in the bearing side.

Removal of Heat

What amount of heat has to be removed during the grinding process? For example, tests proved that stock passing one pair of 3rd break rolls warm up from 4-5° F.; 1 pair of 3rd break rolls 40 in. in length, i.e., having a capacity of 1,800 lb. an hr., the specific heat for break stock is approximately 0.6. The amount of heat produced hourly therefore, is 4.5 x 0.6 x 1,800 = 4860 BTU. The amount of air generally used for the aspiration of one pair of rolls 40 in. in length is 160 cu. ft. per minute; in one hour, this is 9,600 cu. ft. The above air entering the rolls with 62° weighs 0.0768 lb.; 9,600 cu. ft. weigh approximately 730 lb. This amount of air is able to absorb, by warming the air 15° F.=15 x 0.24 x 730=2628 BTU. The rest of the heat, 2172 BTU, can only be removed by evaporation. Air which is not saturated extracts moisture. The extraction of 2172 BTU is possible at a moisture evaporation of 2.23 lb. of water per hour. The moisture loss, therefore, on one passage would be 0.123%.

Milling is a continued grinding process and we experience a relatively large moisture loss when aspirating the rolls by air.

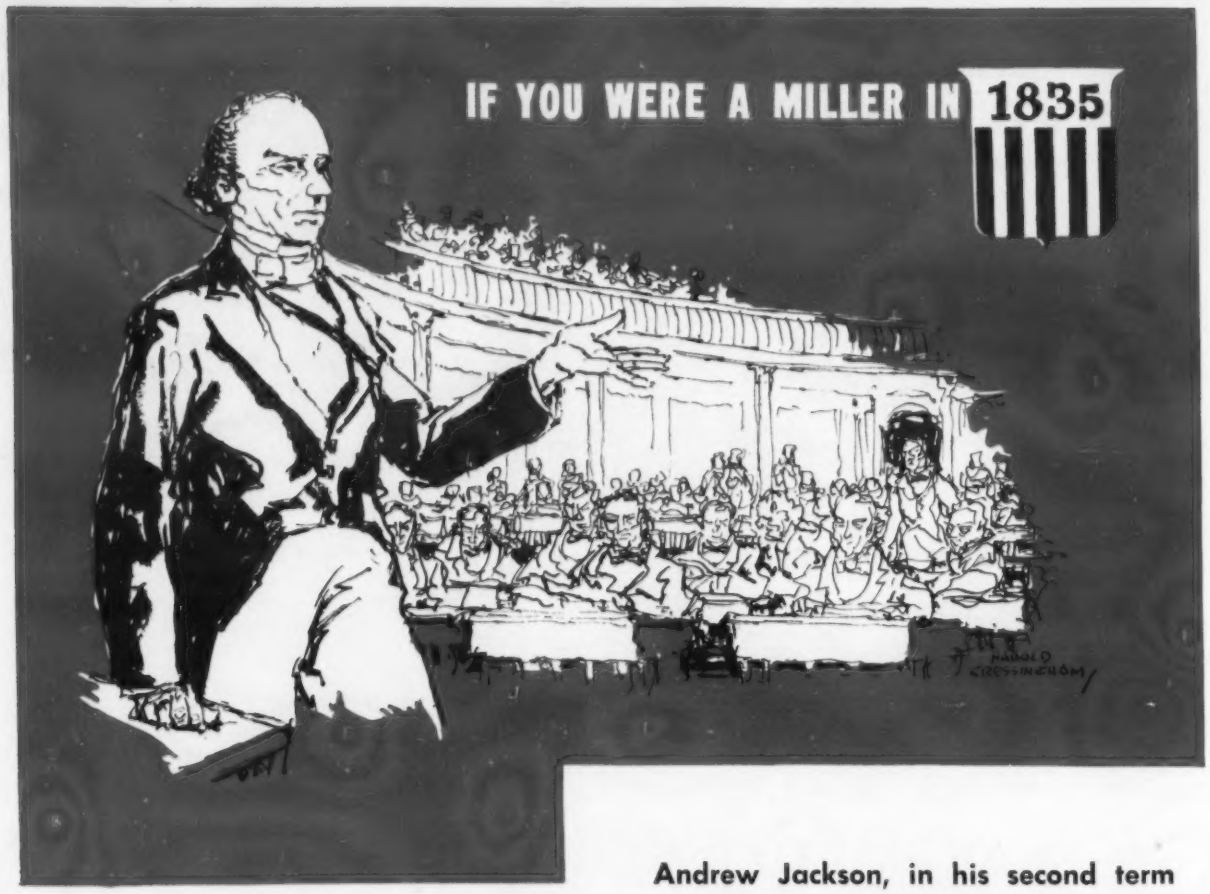
The amount of air used depends on the temperature of air applied. Warm air absorbs more moisture than cold air. In order to keep the moisture loss down, we must try to grind cool; at the same time we should prevent the air absorbing moisture. This could be achieved by cooling the air considerably, which requires artificial cooling of the air so the grinding process takes place under lower temperature. In addition to this, the air should be adjusted so that it will extract only a small amount of moisture from the stock. Such an application is a very expensive one. (Conditioning the amount of air required for the aspiration in a large mill today is thought to be prohibitive for economic reasons.)

Conditions Needed

What are the conditions for cooling the stock through contact on a cold surface — specifically, cooling with water-cooled rolls? In this case, only a small amount of air is required to keep the rolls from dusting. Generally, water is used for cooling the rolls, although it could be done also with cold air. The water consumption is 120-240 lb. an hour per 40 in. roll length (14-28 U.S. gal. an hour per 40 in. roll length). The required amount of water, if the water is warmed up to 22° F., to absorb the 4860 BTU produced is 4860:22=221 lb.=26 gal. an hour. In using air for the same purpose and warming it up from 62° F. to 84° F., we would need: 4860:0.24 x 22 = 920 lb. air. This means that 910 x 12.64=approximately 11,628 cu. ft. of air per hour are required. However, we would have to cool the air in order to cool the stock.

We have surveyed the principal ways in which cooling affects the

(Turn to SCHUMACHER, page 18a)



Andrew Jackson, in his second term as President, was bitterly opposed by Daniel Webster who, with his fiery oratory, had led the Senate to censure the President on the issue of his financial policy.

But you as a miller in 1835 were looking forward to shipping more of your flour to the western states now beginning to open up. You had just bought a few yards of that new Silk Bolting Cloth from Switzerland that all your fellow millers were saying was the best thing that ever happened in sifting fine quality flour.

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THE CONSULTING ENGINEER IN INDUSTRY

Who He Is . . . What He Is . . . How He Can Help

By Henry Schipke and Keith Johnson

Probably the first question that comes to mind is: What and who is a consulting engineer? The Consulting Engineers Council, headquartered at Springfield, Ill., opens their new brochure called "The Story of America's Consulting Engineering Profession" with the following definition:

"A consulting engineer is a professional engineer who offers his services on a fee basis and who has no commercial affiliation to bias him. He is trained in the expert and judicious application of science and technology to the solution of engineering problems, and is one who, through special application, broad experience, proven ability, and professional integrity, provides his client with technical advice of the highest quality in the fields where he practices as an expert."

The words "professional engineer" are used to distinguish the person having education, training, and experience in the application of the arts and sciences, from the individual classed, for wage purposes, as an operating engineer.

A consulting engineer is a professional engineer registered or licensed to practice in one or more states. There are state laws requiring mandatory registration of persons practicing architecture, professional engineering, and land surveying. These laws are to safeguard life, health, and property.

A consulting engineer is one person. He is in many cases a man who has specialized in one field or allied fields, and consequently has studied or worked in this chosen field to become an authority on some phase of engineering. He may have his own firm or he may be a member of a firm composed of numerous professional engineers embracing many fields of engineering. In either case he is usually supported by other personnel who, by work, education, experience and examination, can become professionals.

Consider Small Firms

Do not eliminate the small consulting firm or the individual consultant from your consideration. They will have working arrangements with other consulting engineers and/or architects who will be called upon for special knowledge when needed. This eliminates the need for you to call in other persons or firms and acquainting each one with the different portions of a complex project. This working relationship between consultants permits the consultant engaged by you to be responsible for the complete engineering of the project. His reputation and professional stature depend upon the successful completion of the project.

He works with you as an integral part of the management "team". His goals are management's goals. He is versatile and objective. His recommendations are based upon fact and experience. His judgment is unbiased. He has no commercial affiliation with equipment suppliers or installers nor with building contractors, and he accepts no "kickbacks" or other remuneration from them. He is available when needed, and need not be retained when his services are not required.

The consulting engineer can give good counsel and assistance from the preliminary planning to the final operational stage. A brief summary of the services or work available to the client is as follows:

(1) Preliminary Analysis: He can study and report on existing plant facilities or operating procedures to determine ways of increasing production or operating efficiency, make studies to determine whether it would be profitable or advantageous to undertake a specific operation, and determine the desirable location for the facilities.

(2) Research: Applied basic research is fundamental to the development of new industry. He may have facilities to conduct this development work. If not, he can assist in selection of and guide the efforts of a qualified research organization.

(3) Cost Estimating: Because of the consultant's experience and ready knowledge from day to day work, he can determine quite accurately the preliminary estimated cost of the facilities and their operation. These cost estimates permit analyzation of various layouts, types of equipment, and different methods of over-all design and construction features. In addition, these estimates provide management with the information needed to determine the project's feasibility from the standpoint of "return-on-investment", financing required, and the scope of the work to be undertaken initially.

(4) Site Selection: The success of new facilities depends upon availability of operating personnel and materials, transportation costs, sales and distribution costs, accessibility, site development cost, building costs, local and state taxes, and finally the cost of the property. The consulting engineer is fully aware of these factors and their influence on the development. His objective and unbiased opinion with cost estimates of development has many advantages. He can establish site specifications as a guide for the site selection and inspect them for adequacy.

(5) Detailed Working Plans and Specifications: He can prepare complete plans, specifications, and contract documents necessary for the completion of a project. These plans and specifications may cover a building addition, equipment layout for a new or rearranged process or warehouse, or a complete new plant. The drawings will be of sufficient size and detail to eliminate questionable factors as to strength, size, location, capacity, and operational requirements. This applies to equipment as well as buildings and utilities. He can prepare a "detailed cost estimate" if one is desired, to be used as a basis for the awarding of contracts based on competitive bidding, and assist the client in the securing of bid proposals on portions or all phases of the work and aid him in their evaluation.

(6) Supervision: He will furnish engineering supervision and inspection during the construction progress and equipment installation, and see that all requirements are met and protect the owner's interests. This includes such services as checking manufacturer's shop and working drawings for equipment, review payment estimates, and final testing and inspection.

(7) Operation: He can assist operating personnel in placing the plant in operation. This may include the preparation of written procedures on both operation and maintenance.

When Should He Be Used?

The size of a job should never be the criterion for using a consulting engineer; rather, his use should be based on the need for specialized knowledge, independent engineering judgment, and broad experience. His experience with a piece of equipment is not based on a product alliance, but upon the broad knowledge of looking at and into the performance of a variety of similar equipment.

The firm with no engineering staff is in a special position to use the consulting engineer. In the consultant he has at his call the services of a qualified engineer without the expense of keeping his own staff built-up and trained when they are not required, thus reducing overhead expenses without sacrificing knowledge.

If the owner has an engineering staff, he is in a position to use the consulting engineer as a supplement to that staff, to obtain special information or services without increasing his personnel for a short period of time and then reducing it when the need is no longer there. He can work with the client's own staff on those items which the staff is not capable of handling due to lack of special training or insufficient working hours.

The consulting engineer should be used from the inception of the project. His knowledge from similar or related fields may be put to use to eliminate useless information or studies which, under similar conditions, he has found to be of no value, or to steer the planning along short cuts that he has found in a similar fashion. Also, by engaging him at the beginning of a project, there is no lost time acquainting him with information previously obtained.

The services of an independent consulting engineer are indicated when management and staff are too close to their project to break through a stalemate. A fresh, new, and objective professional opinion and constructive criticism can again permit the project to proceed.

How to Select Him

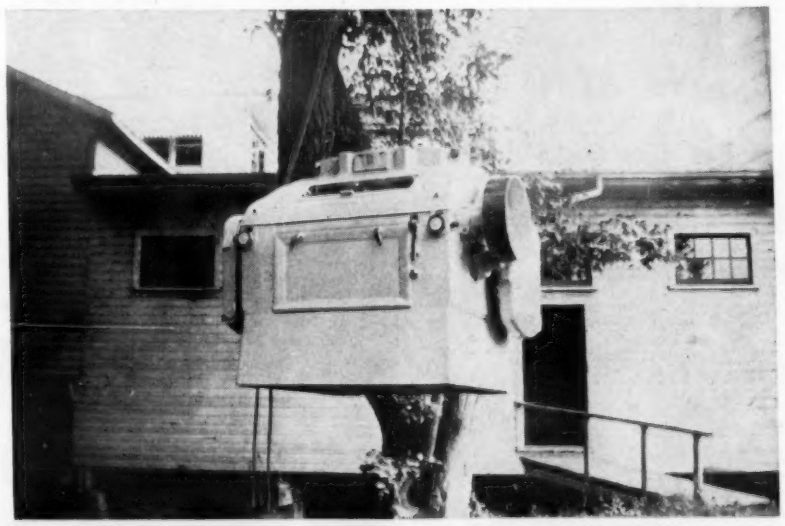
In selecting a consulting engineer there should be one basic consideration used as a guide: The qualifications of the consulting engineer for the project to be undertaken. These qualifications should include, but not be limited to, the following:

(1) An evaluation of his technical qualifications.

(2) His reputation with present or prior clients. (The consulting engineer will gladly submit a list of references, upon request, and they should be contacted.)

(3) His reputation and standing

EDITOR'S NOTE: Medium and small sized mills cannot afford to maintain engineering departments and when faced with the task of modernizing their plants in the light of the latest technological developments they have to seek outside advice. That advice can be given by the consulting engineer, a professional man who is rapidly achieving for himself an important place in the field of technological development. The authors of this article are members of the consulting engineering firm of Henry Schipke & Associates, Minneapolis. Mr. Schipke was with the engineering department of General Mills, Inc., for more than eight years before forming his consulting business for the food, feed and grain industries in 1954. He holds a master's degree in civil engineering from the University of Minnesota and is a graduate of the milling course at Dunwoody Institute. He is a registered professional engineer. Mr. Johnson is a structural engineer and graduated as an architect. He holds a master's degree in structural engineering.



ROLLERMILLS, as millers well know by their cost, do not grow on trees despite this picture. The Hayhoe Bros. mill at Pine Grove, Ont., Canada, bought a couple of roller mills from Thomas Robinson & Son, Ltd., Rochdale, England, and when they arrived were presented with the problem of getting them into the plant. So what happened? The inventive boys in the mill hauled them up a tree and then eased them into the mill.

in his own professional association.

(4) That he is a registered professional engineer.

(5) His experience in projects similar to the one under consideration.

(6) His availability and mobility in relation to the job being considered.

(7) His knowledge of the particular equipment and/or process and services involved in the project.

The size or age of the consulting firm is seldom a dependent qualification in selecting the consulting engineer. The small or young firm of consultants may offer a large and valuable source of information and experience gained prior to going into the consulting business.

In many areas professional associations will supply a client with a roster of member consulting engineers with their field of specialization. By joining an association these consultants have ascribed to the associations' standards of performance and ethical practice.

Approaching the selection of a consulting engineer on a competitive price basis often destroys the confidence and working relationship so vital to securing the best possible engineered project.

How to Work With Him

To achieve the best results, it is imperative that there be a good working relationship between the client and the engineer. To do this it should be the responsibility of one man within the client's organization to act as the communication system between the client and the consulting engineer. It should be the responsibility of this man to pass on to the consulting engineer all information that the client can supply and which the consulting engineer may request pertaining to the project.

The consulting engineer should be given full information at the outset of the project defining his responsibilities completely, the scope of the work involved, and who the communications contact would be through whom he can work to obtain information already in the client's grasp.

The tools that the consulting engineer will use in solving a problem and the where, when, how, and why of the task, must at all times be readily available to him. This may be only a matter of access to a plant to obtain information or a source of information from existing records.

Above all, maintaining a professional relationship between client and consulting engineer will assure the most satisfactory and successful results.

How to Pay for Services

The consulting engineer is reimbursed for his services on the basis of a professional fee determined by negotiation, not by competitive bidding.

There are several ways on which the fee for a particular job may be based:

(1) A percentage of the cost of the engineered project.

(2) A fixed fee.

(3) A fixed fee plus expenses accrued for the project.

(4) Straight hourly rates, plus expenses accrued on the project.

(5) A retainer for continuing consulting services.

The type of engineering project involved may rule out some of the above. For example, an analysis job would rule out a percentage fee since no construction may be contemplated, or a fixed fee may be out of the picture unless a definite scope of work can be outlined, and—should it be required to go outside these limits—the fee would have to be re-evaluated to include these new limits.

The consulting engineer you select will be glad to discuss the various aspects of each fee and apply the one best suited to the interests of both parties.

Irrespective of the basis for the professional fee, the value received will be greater than its amount. This results from:

(a) Savings in construction and equipment costs by competitive bidding.

(b) Reducing plant operating costs to a minimum.

(c) Reduction in capital costs and consequent reduction in continuing taxes.

(d) The elimination of hiring and training technical personnel for short durations.

In Summary

The Consulting Engineers Council appropriately summarizes the consulting engineer as follows:

● "In an age of specialization, the independent consulting engineer has become an important member of the successful management team.

● "Whether he operates as an individual or on a large consulting engineering staff, he brings specific engineering skills to bear directly on any project. His ability to approach an engineering task with objectivity, backed with wide technical experience, increases his value to project management.

● "His service insures competent engineering at lowest commensurate cost. His retention by a company eliminates the need for building up, administering, and then dissolving an internal engineering department created to do just one specialized job or to contribute its talents to the company only occasionally.

● "The range of services offered by America's independent consulting engineers covers all phases of engineering — electrical, chemical, mechanical, civil, structural—and the specialties within those fields such as air conditioning, soil mechanics, process engineering, and plant location studies. Where indicated, the consulting engineer becomes the technical liaison man with architects, contractors, suppliers, or the company's own internal engineering staff.

● "He may enter the job with preliminary analyses and carry his work through to final completion of the project, or be assigned to one particular, specialized phase of the project.

● "Whenever a 'routine' engineering job just won't do—whatever its size or scope—the consulting engineering firm stands ready to provide its services. In each of these efforts, his goal will be to meet the requirements of the job for today, provide for future growth that may be indicated, and insure economical, efficient operation at reasonable costs, both initial and operational.

● "The criteria for selecting a consulting engineering firm are its technical qualifications, its reputation with existing clients, its professional standing and that of its individual engineers, the size and diversity of the organization, its experience in the kind of task to be accomplished, its knowledge of pertinent equipment and services, and its time availability."

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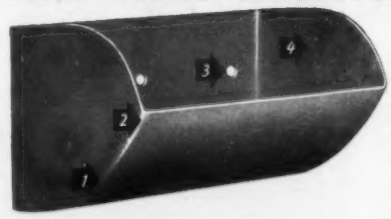

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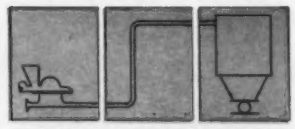

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What's Your Sifter I.Q.?

By Lionel Moore

WHAT products can be sifted? What is the best type of sifter motion? What variables are involved in determining comparative openings of screen cloth? What capacities can you expect?

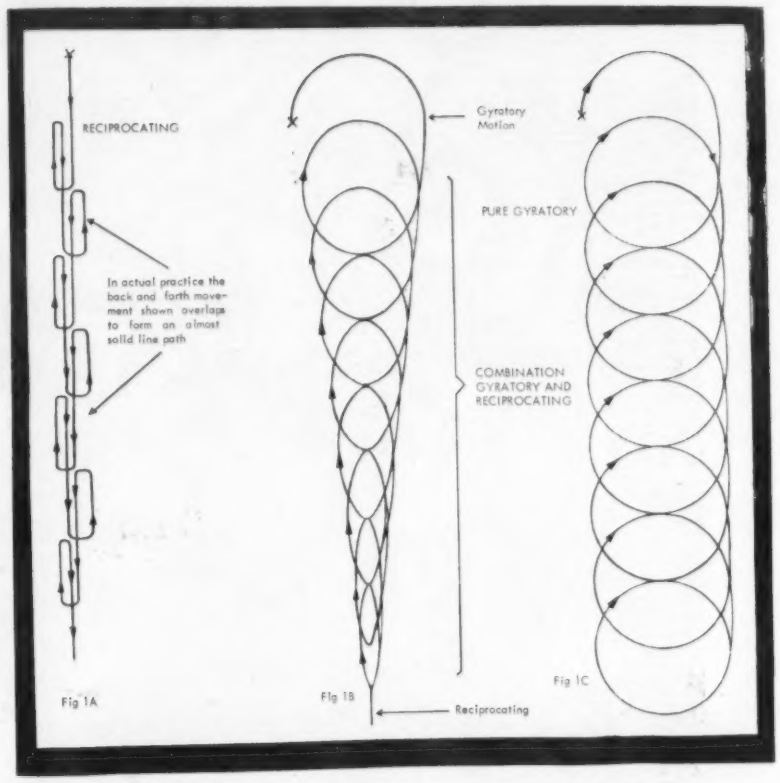
Most organic or inorganic products can be sifted provided they consist of relatively dry particles. Some particles have a tendency to develop electrostatic charges. Others, because of their peculiar shapes, become wedged in the screen openings. Still other particles are relatively free flowing but a thin coating of oil may cause them to become slightly sticky and therefore hard to sift.

Continuous Process

In general, sifting is a continuous process. Particles enter the top of the sifter, are screened to desired multiple separations, and discharged in from two to four different grades through openings at the bottom. The objective is to expose each particle to the greatest number of screen openings. To achieve this, three fundamental types of motion can be applied. They are reciprocating, gyratory, or a combination of the two.

A true reciprocating screen alternates back and forth in a straight line, single-plane motion. A particle dropped anywhere on this type of inclined screen moves in a straight line to the lowest point with the back and forth movement overlapping to form an almost solid line path.

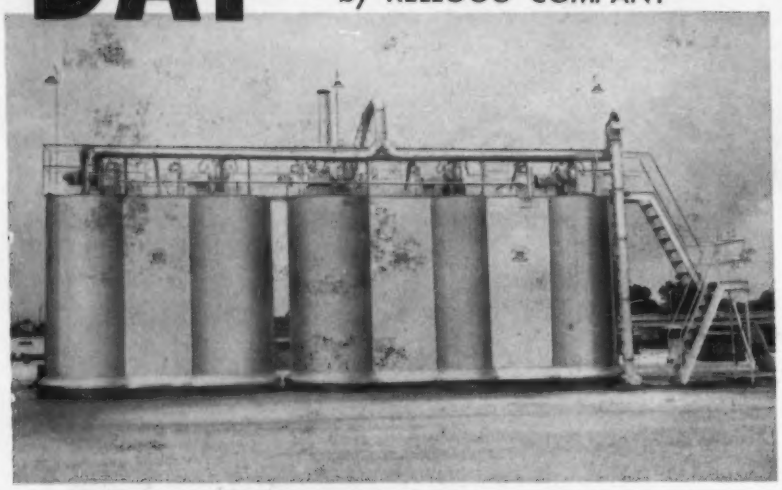
In a combination reciprocating-gyrating screen, a spiral motion is applied to the top or feed end and becomes more nearly reciprocating toward the discharge end. At the head of this screen, a particle describes a nearly circular path. In the same length of travel, it is exposed not only to the same openings as be-



It may be advantageous to consider all three types of motion being used on identical screens having identical characteristics such as amplitude, length of travel, etc. With the combination reciprocal and gyratory motion (1B), a particle would pass over approximately 73% more apertures than it would with straight reciprocal motion. With pure gyratory motion (1C), a particle would pass over approximately 150% more openings than it would with reciprocal and 44.4% more apertures than it would with the combination reciprocal and gyratory motion.

Typifying modern food industry production facilities with increased capacity and improved sanitation is the National Biscuit Co. plant at Fair Lawn, N J., where production is keyed to a battery of 18 Allis-Chalmers gyratory sifters through which every pound of flour must be processed. "The light-weight, easily accessible all-metal constructed screens provide maximum sanitation since they can be cleaned and maintained with little loss of production time. Extremely high capacity per unit of floor space is credited to vertical stacking of six screen cloths, permitting 30 sq. ft. of screen area in 16 ft. of floor space," Allis-Chalmers engineers state.

DAY plant proven bulk storage tanks used for rice tempering by KELLOGG COMPANY



Battery of 5 DAY Insulated Tanks Serving Kellogg's Memphis Plant

Rice for America's most popular rice cereal, Kellogg's Rice Krispies, is tempered in this battery of 5 DAY insulated bulk storage tanks. Located in Kellogg's Memphis, Tennessee, plant, these tanks are 8 feet in diameter and 30 feet high. Designed and built by DAY, they are made of galvanized steel and have 3½ inch insulation covered with an aluminum jacket. In addition to these rice tempering tanks and a bulk sugar storage tank, DAY also supplied dust control equipment including filters and cyclones.

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fore, but to many more on either side of the straight-line path.

As the particle moves away from the drive end of the screen, the pattern resembles a series of ever-changing elipses until finally, over the tail end, it becomes practically a straight line. Thus, as it gets away from pure gyratory motion, it passes succeedingly fewer apertures per amplitude.

The gyratory sifter develops a pure circular motion. A particle dropped anywhere on its flat screen moves in a complete circular path. Because of forward movement (due to screen pitch and feed rate), the particle deviates slightly from a complete circle. However, it maintains an almost constant diameter for full course of travel across the screen, so that the particle is exposed to about 150% more openings than if reciprocal motion were used and 44% more than with combination reciprocal-gyratory motion.

EDITOR'S NOTE: Mr. Moore is an application engineer with the processing machinery department of the Allis-Chalmers Mfg. Co. Here he describes what makes sifters tick in general terms.

This efficient and gentle screening motion handles fragile particles with a minimum of disintegration, thereby reducing undesirable fines. Power requirements are low, with a 1-h.p. motor ample for a three to seven deck unit.

Types of Screens

Sifter screens are of brass, phosphor bronze, steel, stainless steel, monel and various alloys of these metals as well as silk and nylon. The physical and chemical characteristics of the material sifted determine the most satisfactory kind of screen. For example, silk or nylon is sometimes substituted for metal screens to stop mechanical blinding due to undesirable product size, extra heavy layer of stock on screen cloth, or insufficient ball cleaner action.

The product and its sifting characteristics nearly always determine within what range it can be sifted.

Some will sift readily over an entire two to 200 mesh range and beyond while others can only be sifted in the coarse mesh range. Where it is intended to use the same sifter for more than one product, a screen mesh can be selected which will satisfactorily handle, for example, flour, sugar and nut meats.

The term mesh is defined as the number of openings per lineal inch of wire screen. A screen with square openings need only be checked along one side to determine its mesh. Two standards—Tyler and U.S.—have been established to assign a definite opening to each screen mesh.

Three variables are involved in determining the comparative openings of screen cloth. These are the mesh or number of openings per lineal inch, the actual openings between the wires, and the diameter of the wire. It is impossible to change the mesh, wire diameter or openings in a screen without affecting either or both of the other variables.

Sifter capacity of products is determined by their penetration rates through a given mesh screen. In the case of cake, bread and biscuit flour, a gyratory sifter with four screen decks of 16 mesh U.S. standard would handle about 500 lb. a minute. This is increased to about 550 and 600 lb. a minute for five and six screen deck sifters, respectively, 16 mesh U.S. standard, and reduced to some 200, 250 and 300 lb. a minute for four, five and six deck sifters using a 50 mesh U.S. standard.

The flexibility of screen combinations in a gyratory sifter permits a wide range of capacities. For re-screening or scalping, a combination of deep decks makes it possible to handle a greater depth of material over each screen cloth and pan. In most cases, three or four deep decks will handle a greater volume and more capacity than five or six shallow decks.

For grading, capacity is dependent on the total square feet of screening area. To provide the greatest flexibility for this operation, the number of screen decks can be varied from three to a maximum of seven shallow decks.

Besides operating on lower power requirements, gyratory sifters require little floor space and are easy to clean and maintain.

MILL COGS

We make ALL kinds. Specialize in "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "DW" and instruction sheets free.

The N. P. Bowsher Co., South Bend, Ind.

SUPERIOR CARBIDE TOOLS
For All Roll Corrugating
Economical Increased Output
CORRALLOY TOOL CO.
Minneapolis 7, Minn.

LET **DOTY** DO IT
If Your Lab Is Overloaded
Sanitation Analyses - Wheat and Flour
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P. O. Box 7474
North Kansas City 16, Mo.

BAG DAMAGE ENDS... when you use multiwalls made of CLUPAK* extensible paper!

NEW, TOUGHER KRAFT SOLVES BREAKAGE PROBLEMS

New CLUPAK extensible paper offers multiwall buyers a happy choice . . . Because CLUPAK extensible paper has a patented, built-in stretch and "give," it simply absorbs most shocks and strains that rip, split or tear conventional kraft. By specifying CLUPAK in your kraft bags, you solve your breakage problems once and for all. Multiwalls of CLUPAK fill faster, palletize better and handle easier. For special handling problems, CLUPAK can be supplied with a rough outer-sheet to provide far better anti-slide protection for your product.

Millions of these new multiwalls have proved the advantage of this tougher, stronger paper. Plan a trial shipment of multiwalls, made of CLUPAK, as part of your next bag order. See the difference for yourself. Your customers are sure to like the extra service of a better, more dependable bag . . . and so will you.

*Clupak, Inc's. trademark for extensible paper manufactured under its authority and specifications. Clupak, Inc., 530 Fifth Avenue, New York 36, N. Y.

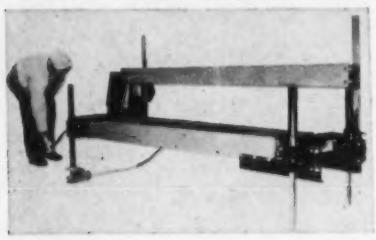
Worth Looking Into

New Products
New Services
New Literature

This reader service department announces the development of new and improved products, new services and new literature offered by manufacturers and suppliers. Claims made in this department are those of the firm concerned. Use the accompanying coupon to obtain the desired information.

No. 9158—Flat Belt Conveyor

A flat belt conveyor which can be adjusted in height as well as in length has been announced by Richardson Scale Co. An adaptation of the Model GA-11 bag conveyor which allows changes in length from 7 to 12 ft., the unit's standard height of 8 in. can be jacked by one operator to any



position within a range of 12 in. The conveyor is designed for all package conveying, and in particular to convey filled bags from weighing and packing equipment through a sewing operation. The surface of the belt is absolutely flat, the company says, because the belt rides on flat metal skid plates. All sizes of bags can be conveyed. For further information, check No. 9158 on the coupon and mail.

No. 9147—Indicator Unit

Remote indication of both batch and cumulative weights is given in a unit introduced by Richardson Scale Co. The unit combines indicator and single unit totalizer. Totalizer records cumulative weight in pounds either of a single ingredient or, when used in a proportioning system, of a combination of ingredients. Output during any hour, shift or day may be read directly on the totalizer-counter. The indicator pointer, remote from the dial scale, follows the dial scale pointer movement. As the indicator pointer rotates, the counter is driven through an electric clutch and suitable gearing to totalize pounds of material. When the dial scale returns to "zero" position, the pointer on the indicator also returns to the zero position, but the counter remains at the accumulated weight.

The counter can have a graduated units wheel, one or more dormant zeros, or a decimal point, depending on the capacity and readability desired. The standard counter contains six digits and has a reset feature. The indicator-totalizer is available with its own dust-tight enclosure. For more information check No. 9147 on the coupon and mail.

No. 9169—Bag Sealing Device

Crown Zellerbach Corp. announces the development of a new sleeve—the Crown Cuffed Tuck-In-Sleeve—designed to assure tight, durable sealing of multiwall pasted valve bags. The cuffed TIS for flush cut or stepped-end pasted valve bags is turned back at the insert end of the sleeve to provide a double-thickness (or cuff) approximately 1½ in. wide. The cuff plus a band of adhesive assures a flat, securely-held, sift-proof closure, the company says. The unit can be tucked deeper into the critical valve area, the company says, assuring snug seating of the sleeve-end into the cuff pocket well past the glue line. For more information, check No. 9169 on the coupon and mail.

No. 9175—Catalog Guide

A catalog guide of equipment for the process industries has been released by Allis-Chalmers Manufacturing Co. Included in the guide are descriptions of compressors, vacuum, centrifugal, axial flow and turbine pumps, and valves for fluid flow; crushers and grinding and roller mills for disintegration, mixing and agglomeration; vibrating screens for dry separation; blade mills, pool washing screens and log washers for liquid separation; kilns, dryers, slakers, pelletizers, coolers and liquid heaters for heat transfer. The guide also covers electrical equipment for the complete process plant, electronic metal detectors, water conditioning equipment, chemicals and service, as well as car shakers, lift trucks and tractors. Copies can be obtained by checking No. 9175 on the coupon and mailing.

No. 2165—Approval For Roto-Guard

Roto-Guard, the positive motion indicator safety mechanism manufactured by The Bin-Dicator Co., has been accepted for listing by Underwriters' Laboratories, Inc., Chicago, and has been approved and listed by the Canadian Standards Assn. Roto-Guard is a machinery safeguarding mechanism designed to convert rotary motion into an electrical signal.

Send me information on the items marked:

☐ No. 2165—Roto-Guard	☐ No. 7785—Bulk Handling
☐ No. 2166—Report	☐ No. 9147—Indicator
☐ No. 2167—Device	☐ No. 9158—Conveyor
☐ No. 2168—Chart	☐ No. 9169—Sealing
☐ No. 7773—Loader	☐ No. 9175—Catalog

Others (list numbers) .....

NAME .....

COMPANY .....

ADDRESS .....

SLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS
PERMIT No. 2
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BUSINESS REPLY ENVELOPE
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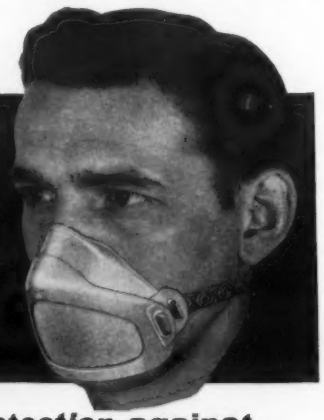
P. O. Box 67
Reader Service Dept. Minneapolis 40, Minn.

The Improved
FLEX-A-FOAM
Dust Mask



Your best *ounce* of *protection* against
IRRITATING DUST

HERE'S WHY:

- **Workers wear it.** Lightweight (just 1 ounce), snug, comfortable and easy-to-breathe through, Flex-A-Foam is the **one** respirator your workers actually **welcome.**
- **It's super-efficient.** Flex-A-Foam's pure latex filter protects against nuisance dust particles 100 times smaller than the eye can see!
- **It's simple.** Only four sturdy, long-wearing parts — all interlocking — all **unconditionally** guaranteed.
- **And — it's economical. Low first cost** — less than any other **quality** respirator on the market. **Low upkeep** — washable filter outlasts throw-away type by more than 100 to 1!

Dust Protection Your Workers Will Welcome and Wear

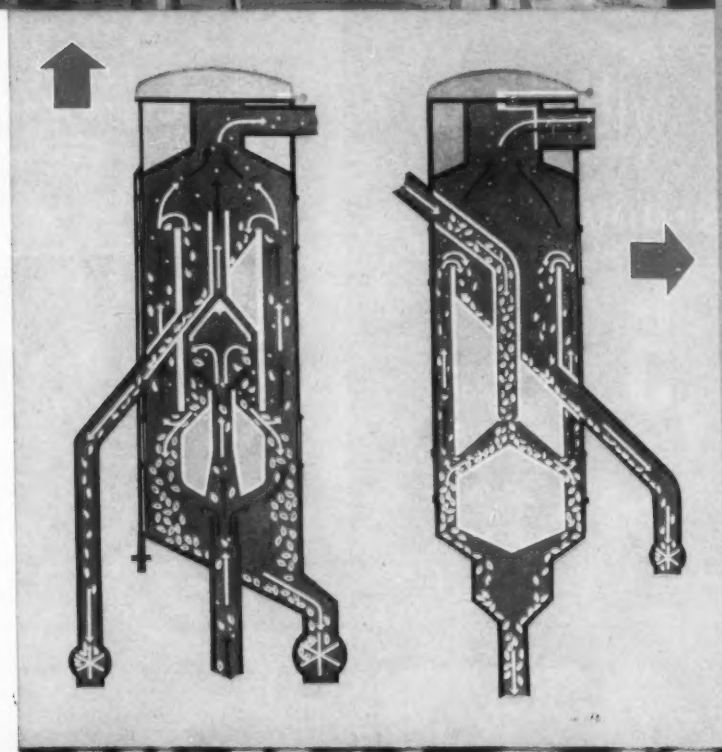
Sample
$1.45 postpaid (Industrial price only)

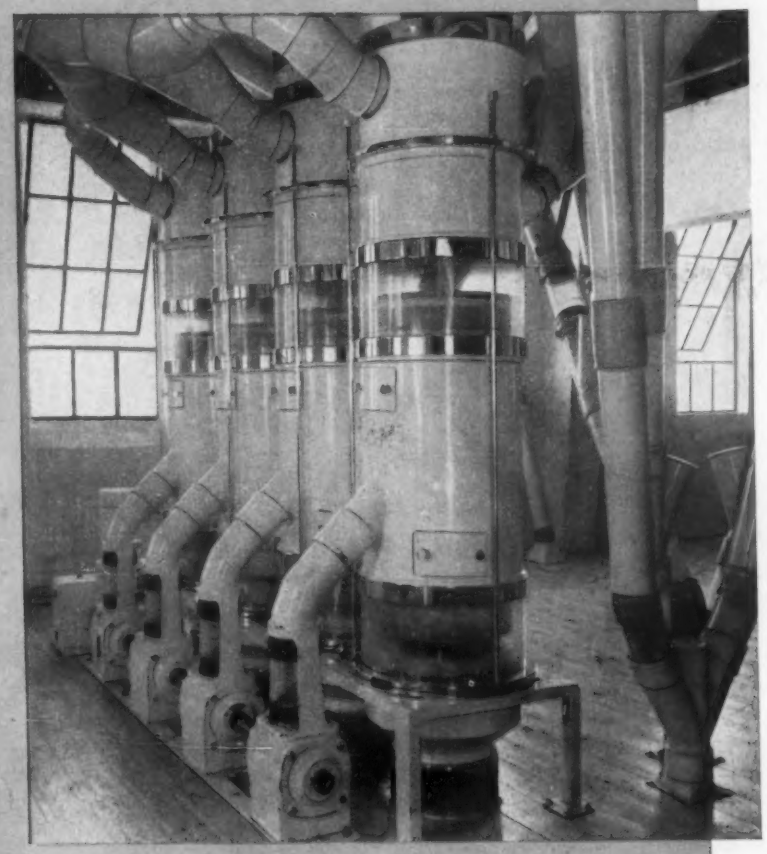
FLEX-A-FOAM DUST MASK®

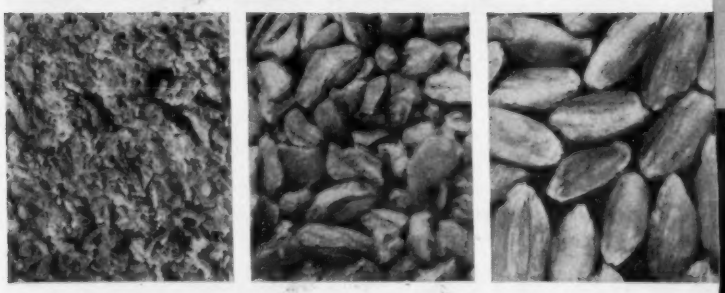
FLEXO PRODUCTS, INC. • Westlake, Ohio

PNEUMATIC SEPARATOR
OR
GRAVITY SEPARATOR

Excellent separation of rodent pellets and superior cleaning by air separation. Circular arrangement of separating zone gives a maximum spread of grain.







MIAG Gravity Separator

A selfcontained unit that can be installed in existing cleaning houses.

MIAG
BRAUNSCHWEIG / Western Germany

U.S.A.
MIAG NORTHAMERICA, INC.
1616 So. 8th St., Minneapolis 4, Minn.

Canada
THE TRIMONT CORP., LTD.
P.O. Box 25, Sta. "H", Montreal, P.Q.

This signal impulse may be used to energize an alarm system or to operate control switches automatically. Construction of the Roto-Guard may be considered fail-safe, claims the manufacturer, since any failure in its mechanism results in actuation of the safety controls to which it is electrically connected. It is available in general purpose and explosion-proof models to provide reliable protection for conveyors, feeders or process machinery where stopping or slowdown may cause damage. New literature now available details each of the Roto-Guard units being offered. For details, check No. 2165 on the coupon and mail.

No. 2166—Pneumatic Handling Report

Case histories illustrating recent advances in the handling of bulk materials by adaptation of pneumatic equipment are the subject of a new eight-page technical report offered by the W. W. Fuller Co. Cases cited, among others, describe installations for handling bread flour, mixed feed, wheat shorts and barley. Nineteen photographs show a wide variety of equipment in operation in diverse industries, including food processing. For details, check No. 2166 on the coupon, clip and mail to this publication.

No. 2167—Pneumatic Reversing Device

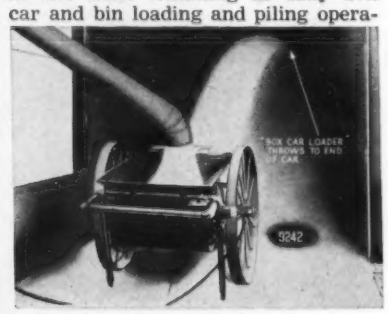
Powers Regulator Co. has introduced its Type 783 reverse relay, a pneumatically-operated auxiliary device which reverses the action of a pneumatic valve, motor, or damper. It can be used wherever the action of the controller must be reversed. A recommended application is in combination with normally-closed valves where "fail-safe" protection must be provided in case of air failure. Its compact size, 19/16-in. diameter by 2⅝-in. long, is 60% smaller than its predecessor model. It can be mounted behind control panels, next to wall-mounted thermostats, or directly on a valve or damper motor. For details, check No. 2167 on the coupon, clip and mail to this publication.

No. 2168—Chart For Filter Cloths

Wheelbrator Corp. offers a handy comparison chart as a guide to the selection of filter cloths commonly used in dust and fume collectors. Cotton, nylon, orlon, dacron and silicone treated glass are classified according to temperature limits, strength, resistance to acid, alkali and abrasion, and relative cost per bag. Since each fabric possesses qualities favorable to certain of these conditions, selection can be readily determined on the basis of particular needs. Copies of the Filter Cloth Comparison Chart may be requested. Simply check No. 2168 on the coupon, clip and mail.

No. 7773—Loader and Piler

Loaders and pilers, designed to eliminate hand trimming in daily box car and bin loading and piling operations handling feed, fertilizer, grain or similar bulk materials, have been announced by Stephens-Adamson Manufacturing Co. The units operate on the centrifugal action principle, where material is thrown from the unit's short endless high speed conveyor belt in any desired direction. One man can place the loader and piler in a box car or bin and direct the stream of materials toward one end. The loader throws the material to the farthest corner and requires no further attention. The units are available in two sizes, normal duty and heavy duty. The heavy unit varies from the other in that it handles larger lumps in unusually large capacities. For details, check No. 7773 on the coupon and mail.



No. 7785—Bulk Handling Report

Case histories illustrating advances in the handling of bulk materials by adaptation of pneumatic equipment are included in an eight-page technical report available from Fuller Co. Cases cited concern installations for unloading materials from railway cars and moving it through storage and in process and for transfer of alumina from rolling stock to seagoing vessels. Other installations described handle bread flour, mixed feed, barley, wheat shorts, dehydrated alfalfa and others. Nineteen photos are included. For copies, check No. 7785 on the coupon and mail.

test protein on the spot . . .

with this new 5 minute test

High protein means extra money in your pocket . . . but first you've got to find and measure it!

Now you can make your own reliable protein tests in five minutes or less . . . no more days of waiting for laboratory analysis. This means that you can bin your grain or flour by protein percentage *as soon as it's received* . . . blend your incoming shipments for the top resale profit.

This amazing new development, the UDY PROTEIN ANALYZER, introduces a newly discovered principle that now makes possible fast, economical, accurate "on the spot" analysis. You operate it simply without special skills or training.

Whole grain wheat is analyzed by weighing a specific sample and adding a measured amount of a special dye solution which reacts quantitatively with the protein. The sample is then wet milled in the unique React-R-Mill for three minutes. Reaction of the dye with protein is then complete and the remaining unbound dye is merely measured in the color analyzer. This reading is converted directly into protein percentage. Flour is analyzed in the same manner except that milling is unnecessary.

Phone, wire, or write now for further information on increasing your profits with the new UDY PROTEIN ANALYZER. Since production of these units is still limited, your early response may be particularly important.

for full details contact . . .

HEGMAN, INC.
506 Grain Exchange Building
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Exclusive National Distributor

UDY ANALYZER COMPANY

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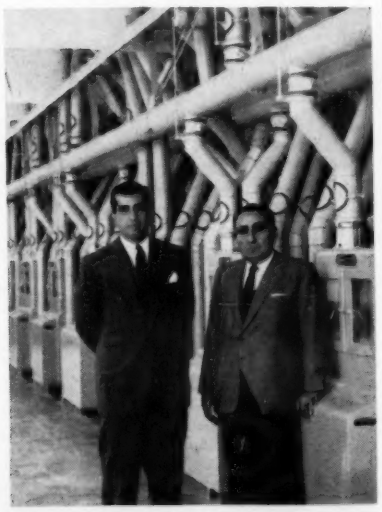
Semolina Mill Opens For Firm in Greece

UZWIL, SWITZERLAND — The milling engineering firm of Buhler Bros., with headquarters here, has announced the start-up of a new mill for semolina at La Piree-Keratsini in Greece.

The St. Georges plant at La Piree-Keratsini; the new semolina plant is located in the center of the building.

Roller mills on the first floor.

Cyclones in the mill.



Directors of the St. Georges mill—A. Simeonoglou (left), and N. Bodouroglou.

The mill was built for St. Georges Mills S.A., reputedly the largest milling group in Greece with plants in La Piree and Patras. In 1926, the firm built its first flour mill at La Piree-Keratsini with a capacity of 3,000 cwt., basis 24 hours of working. A Buhler mill for producing 1,800 cwt. whole wheat flour a day was added in 1932. Later, St. Georges bought a 1,700 cwt. flour mill, also Buhler-built, at Patras.

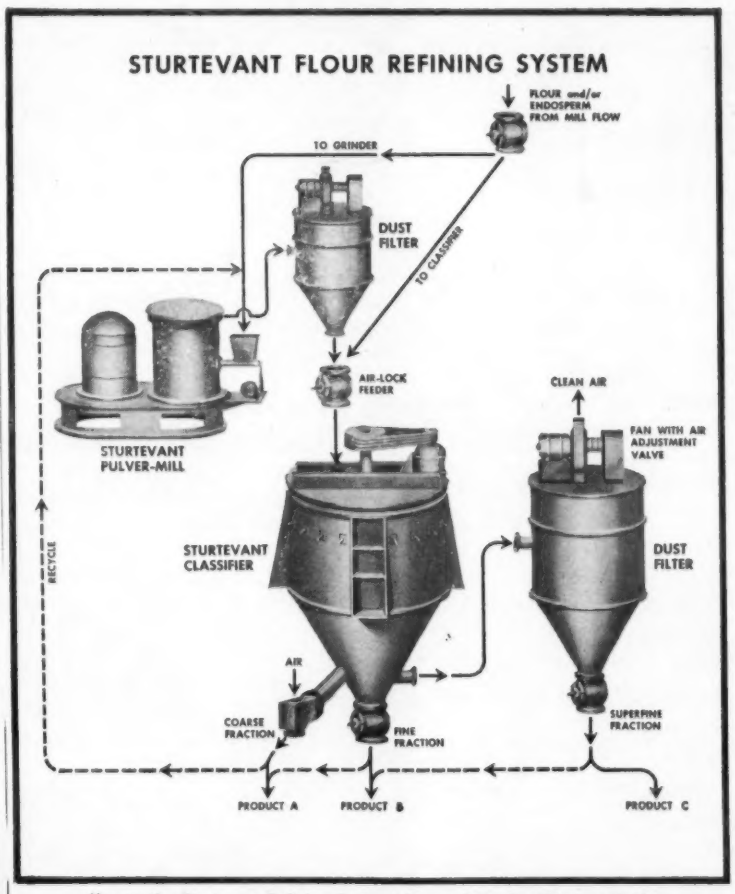
Besides producing wheat for bread and cake flour, Greece grows a considerable quantity of durum. The market for semolina has increased in recent years and so has the demand for a quality product. Responsible for that are the semolina manufacturers and the government.

But Greek wheat often contains considerable impurities such as vetches, oats, barley and stones. One of the major tasks facing the Buhler engineers, therefore, was in the design and equipment of the cleaning plant.

All rollermills have power saving roller bearings and unic speed regulators for the feeding rolls. The 3-sieve layer purifiers produce a high extraction in finished semolina in one single passage and the flow sheet is clear and simple, the Buhler people state. Sifting is done on their MPAB sifters.

The finished products are automatically packed off on two floors directly underneath the mill. As the bags leave the packing machines, they are loaded into railroad cars or ships through chutes and over conveying belts. Bran, shorts and red dog are conveyed pneumatically into mixing bins.

New Sturtevant Flour Refining System is Highly Flexible, Makes Precise Separations



Key to the Sturtevant Refining System shown above is a Sturtevant Air Classifier which can produce 3 kinds of flour in one operation. Both the Pulver-Mill and the Air Classifier have exceptionally large capacities.

For protein shifts... Primary classifications.. Coarse or fine separations for new end products

Sturtevant's new flour refining system is the result of 44 years of experience engineering classification systems for food and other industries.

Heart of the special system is a Sturtevant Air Classifier which classifies coarse, fine and superfine fractions. Low volume of air requirements means smaller dust filters. Thus savings in both space and costs are effected.

The Classifier makes precise selections of end products by means of exact control of air currents and centrifugal force. Simple adjustments in counter action between these two forces permit the receipt of almost any desired particle size.

Operation of Sturtevant's new flour refining system is highly flexible. The Pulver-Mill and Air Classifier can be used singly or together, in accordance with individual grinding-classifying needs.

CALL ON STURTEVANT to help you upgrade your milling system while lowering production costs. Sturtevant Flour Refining Systems offer much higher output capacities than are available elsewhere, yet require only 1/3 as much capital investment.

Write today describing your requirements. A Sturtevant engineer will be happy to make recommendations based on 44 years' successful experience with grinding-classifying problems. Address your letter to *Grain Processing Division, Sturtevant Mill Company, First National Bank Bldg., Fostoria, Ohio.*

CRUSHERS
GRINDERS
MICRON-GRINDERS
SEPARATORS

STURTEVANT MILL COMPANY
BOSTON 22, MASS.

BLENDERS
GRANULATORS
CONVEYORS
ELEVATORS

Flour Mill—Kansas State University

Machinery and Equipment Requirements

ROLLS

Roll Floor—2nd Floor—

3 Simon—10″x24″ roller mills, type G
- (1) stands No. 1, 2 and 6

3 Buhler—10″x24″ roller mills, type MDDC
- (1) stands No. 3, 7 and 8

3 MIAG—10″x16″ roller mills, type HN
- (1) stands No. 4, 5 and 9

Roller Mill Specifications—

- (1) Slow rolls to be chain driven
- (2) Automatic engaging and disengaging device
- (3) Three-speed clutch arrangement on roll feeder assembly
- (4) Fast roll pulley to be standard size and to have no crown on pulley face (For V flat drive)
- (5) Roller mill to be arranged to handle two separate stock classifications
- (6) Roller bearing equipped
- (7) One pair extra roll chills of Simon, Miag and Buhler

NOTE: Corrugating details to be furnished, plus stock classifications as related to differential speeds, roll feeder assemblies, etc., at time of placing order.

PURIFIERS

Purifier Floor—3rd floor—

1—Buhler purifier, type MDRC-4
- (1) To be installed as Purifier No. 1

1—MIAG purifier, type 30 DK
- (1) To be installed as Purifier No. 2

1—Simon-Carter purifier, type R
- (1) To be installed as Purifier No. 3

A. Buhler MQRC-4 Specifications—

- (1) Oscillating mechanism to be driven by individual motor (220-440 V)
- (2) Sieve lighting both above and below sieves
- (3) Six extra sieve frames
- (4) Outlet boxes (conveyor)
- (5) Inlet glass transitions
- (6) Transition between air head and regulator valve
- (7) Air regulation valve
- (8) Six spare coarse sieve brushes, six brushes for fine mesh clothing

B. MIAG — Type 30 DK Specifications—

- (1) Individual motor drive arrangement
- (2) Electrical inside lighting
- (3) Four extra sieve frames
- (4) Conveyor discharge boxes
- (5) Transition from air trunking to purifier
- (6) Spare sieve brushes

C. Simon-Carter Purifiers type S—

- (1) Individual motor drive arrangement
- (2) Electrical inside lighting (if obtainable)
- (3) Four extra sieve frames
- (4) Rotatube spout connectors
- (5) Transitions from air trunking to purifier
- (6) Spare sieve brushes

(Power required ¾ HP)

Feed Dusters—3rd Floor—

1—Bran Duster—Size O
- (a) Machine case covered with No. 30 duster wire
- (b) Equipped with top driving arrangement
- (c) One set extra nylon brushes

1—Shorts Duster—Size O
- (a) Covered with No. 34 duster wire
- (b) Top driving arrangement
- (c) One set extra Tampico brushes

1—Richardson automatic wheat dump scale incorporating electrical timing dump control (Tempered wheat scale) 1 bushel per tip

2—Suspended Howe Hopper scales, complete with printer and with dial type face graduated in pounds up to 1,000 pounds. (One scale for finished flour and one for mill feed.)

1—Grinding bin (tempered wheat) approximately 3 ft. diameter x 6 ft. high fabricated from 20 gauge galvanized iron. (Salina Mfg. Co.)

Sifter Floor—4th Floor—

5—2x14 free-swinging sifters
- (a) To be flowed and clothed as per sketch with order
- (b) All to have Nordyke type standard sieves
- (c) All sifters to have conventional throw and speed
- (d) Sifters to have manufacturer's method of individual motor drive (preferable overhead top drive)
- (e) Inlet and outlet collars and stockings to be included

Suggested Suppliers — Allis - Chalmers, Sprout-Waldron, SMICO, Nor-Vell and Great Western.

1—B. F. Gump 6 sieve Gyro sifter
- (a) Single section 6 sieve
- (b) Equipped with Nordyke type sieves
- (c) Floor-type mounting
- (d) Individual motor drive arrangement
- (e) Sifter to be flowed according to sketch

INSIDE SCIENCE

The Vital Story of MACARONI* ENRICHMENT

by Science Writer

This is the fourth article in a series devoted to the story of cereal enrichment

Dramatic results have been recorded about the value of enrichment in improving health. From the United States, the Bataan peninsula in the Philippines, Newfoundland and many other parts of the world comes word of the great benefits which result from enrichment.

For years, some forward-looking manufacturers of macaroni and noodle products have used enrichment to make their good foods better. They know that enrichment restores important vitamin and mineral values which are unavoidably lost in milling, and they recognize their responsibility to provide the greatest health-building benefits for the public.

Enrichment is really a simple process. It adds the following essential elements to the food during manufacture.

Thiamine—also called vitamin B_1. This vitamin helps to build physical and mental health. It is essential for normal appetite, intestinal activity and sound nerves.

Riboflavin—also called vitamin B_2. This vitamin helps to keep body tissues healthy and to maintain proper function of the eyes. It is essential for growth.

Niacin—another "B" vitamin, is needed for healthy body tissues. Its use in the American diet has done much to make a serious disease called pellagra disappear.

Iron—is a mineral used in all enrichment. It is essential for making good, red blood and preventing nutritional anemia.

Products made from semolina may be enriched by two methods. One uses small square wafers which contain all the vitamins and iron necessary to enrich 100 lbs. The wafers break up in a small amount of water which is then added to the paste. For manufacturers who use the continuous press method, a powdered concentrate of the vitamins and iron, called a premix, is available. This is added by a mechanical feeding device.

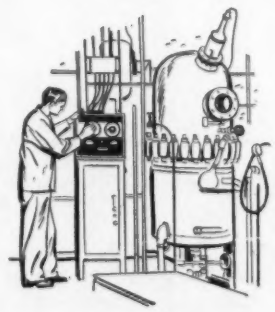
**Macaroni is used here in the generic sense. It includes all alimentary pastes: macaroni, spaghetti, pastina, noodles.*

These are the minimum and maximum levels, in milligrams per pound, required by the Federal Definitions and Standards of Identity for enriched alimentary pastes.

	Min.	*Max.*
Thiamine (vitamin B_1)	4.0	5.0
Riboflavin (vitamin B_2)	1.7	2.2
Niacin	27.0	34.0
Iron	13.0	16.5

NOTE: These levels allow for 30% to 50% losses in kitchen procedures.

Nowadays scientists are able to "build" duplicates of many of Nature's essential complexes in the laboratory. This has happened with many vitamins. First the chemical composition is learned and the pure substance is isolated. Then a "duplicate" is made which is identical chemically and biologically with Nature's product. A vitamin is a vitamin regardless of its source just as salt is salt whether it comes from a mine or is evaporated from the sea. So efficient is large scale manufacturing that vitamins are sold at a lower cost than if they were extracted from natural sources.



The Hoffmann-La Roche people, who produce a good percent of the vitamins used in enrichment, use amazingly complex processes with scientific production controls. This requires modern, special equipment filling whole buildings, each one a city block square and many stories high.

The combination of scientific research, thorough know-how and mammoth manufacturing processes—plus the far-sightedness of leaders in the macaroni industry—is helping vitally to make good macaroni products better.

This article, reprints of which are available without charge, is published as a service to the macaroni industry by the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West, Montreal, Quebec.

Cast Iron Sifter Stubs—Allis-Chalmers
(a) Stubs to be 4" diameter 72 in number

FLOUR TREATMENT SYSTEM

(a) One double flour agitator, smallest size complete with motor drive and secondary transmission
(b) Three dry chemical feeders
(c) One Dyox machine complete with blowers, hoses, etc.
(d) One chlorinator

MILLING ACCESSORIES

1—Eriez permanent type spout magnet—4"
1—Rotomatic experimental sifter, complete with floor frame, motor and equipped with 24 sieves clothed as follows:
8XX, 9XX, 10XX, 11XX, 12XX, 13XX, 14XX, 15XX, 8W, 10W, 12W, 14W, 20W, 24W, 26W, 28W, 30W, 32W, 34W, 36W, 40W, 50W
1—Humidity control system for roll floor
Pre-fab spouting for flour mill
Pre-fab spouting for cleaning section

AIR FILTER SYSTEM—5th Floor

A. 1—64 AC6 Day Co. filter complete with fans and motors (approx. 3,000 CFM). (Kice Metal Co. to furnish details)
Pneumatic Systems Complete Mill and Cleaning Sections—Kice Metal Co.
B. 1—Filter to handle purifier air (Details and contact to be handled by Gene Farrell)
C. 1—Fan to handle 4,000 C.F.M. 6" S.P. complete with 10 HP TEFC motor, 44 V, and necessary driving arrangement. (Purifier air) (Engineering details—Gene Farrell)

TRANSMISSION FOR ROLL FLOOR—Mezzanine

10—5 HP - 1200 rpm, TEFC, 3 phase 440 V motors. Motors to be ceiling mounted with adjustable rail for vertical mount and take-up
10—3 HP - 1200 rpm, TEFC, 3 phase 440 V motors. Motors to be ceiling mounted with adjustable rail for vertical mount and take-up

Sheave and V-Belt specifications—
(a) 18—Sheaves 6.5 pitch dia., 3 groove, B section Sheaves to have taper lock hub
(b) Bushings for hubs to be determined by shaft dimensions of motor
(c) 18 sets—matched V belts, B section, approx. 150" long

Roll Floor—
18—Combination magnetic starter and disconnect switches (440V) Class 2, Group G
18—Start and stop push button stations (440V)

PACKING EQUIPMENT

Flour Packer
1—Bemis Packerette complete with connecting hopper, sewing machine and checkweigh scale. (Bemis Bro. Bag Co.)

Feed
Complete bulk feed transport system for finished feed to storage.

CLEANING SECTION

The equipment will be listed in the order of flow.

1. Nine-in. screw conveyor—15 ft. conveying grain from feed mill building to mill grain storage tanks. Right hand.

2. Six-inch Dracon Conveyor approximately 32 ft. in length distributing to storage tanks. (Right hand; 2 HP)—J. B. EHRSAM.

3. Two-way valves for distribution to bins. (Total 7.)

4. Fourteen steel storage bins 51 in. diameter by 29 ft. high, including hoppers—DAY CO.

5. Feeders from storage bins volumetric type maximum over-all height 18 in. (Total 14; ½ HP.)

6. Reversible 6-in. screw conveyor for gathering wheat from feeders. (Approximately 30 ft. in length; 3 HP.) To feed mill or flour mills.

7. Elevator leg casing 5x5 in. (2 HP.)

8. Two 100 bu. mill mix bins 4 ft. in diameter, 12 ft. in height including hoppers.

9. Richardson 1 bu. timer scale 65 in. height, 3 ft. 9 in. long, 28 in. wide. This includes hopper under scale—RICHARDSON.

10. Rotary valve with drive under scale 12 in. in height. (Pneumatic conveying)—KICE.

11. Collector (Pneumatic conveying)—KICE.

12. Spout magnet—ERIEZ.

13. Number 4 Carter millerator, height 68 in., width 53 in., length 92 in., height to inlet 48 in., horsepower 2, 1030 RPM, 220 CFM.

14. Model BV Forsberg Stoner, height 55½ in., width 28 in., length 52 in., 1500 CFM, 1 HP.

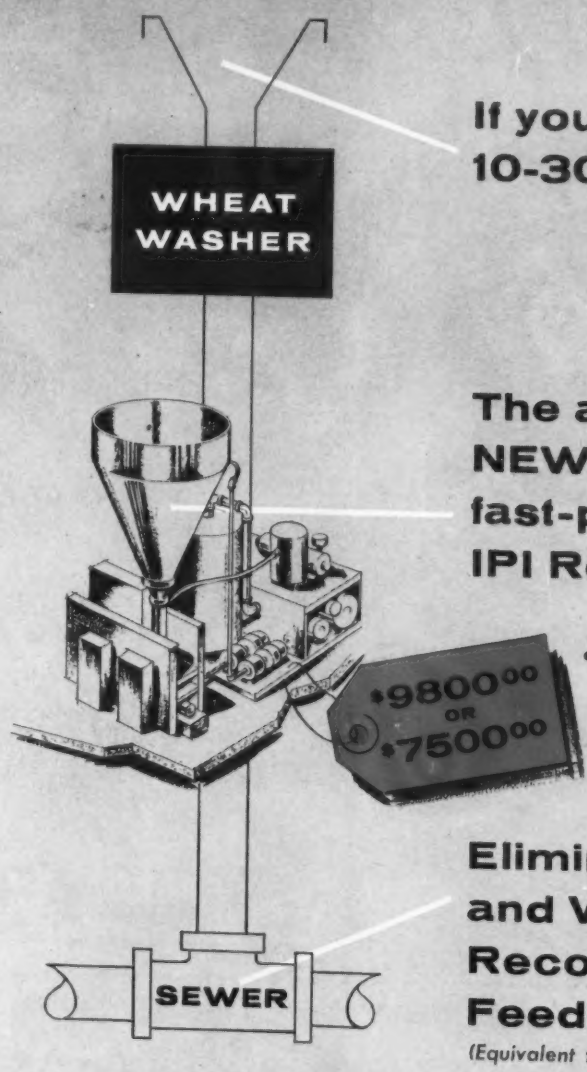
15. Airlock with drive (Pneumatic conveying)—KICE.

16. Collector (Pneumatic conveying)—KICE.

17. Number 1821 Carter oat disc, 44 in. wide, 71 in. long, 35¼ in. high, 1 HP.

18. Model 1821 Carter grader disc, 44 in. wide, 71 in. long, 35¼ in. high, 1 HP. Note: Oat disc to be mounted over grader disc.

19. Double entoleters, 24 in. in di-



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Eliminates Sewage and Water Problems... Recovers Profitable Feed Supplement

(Equivalent to one hour's grind in 8 days or less.)

* **$9800.00** is price for complete package unit, including integral wiring and plumbing, ready for connecting to water source, sewer and power, F.O.B. Portland, Oregon, *plus license*.

$7500.00 is price for "do-it-yourself" installation, F.O.B. Portland, Oregon, *plus license*.

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ameter, 10 ft. high, 3 HP per machine, 1500-20000 CFM. — SAFETY INDUSTRIES.

20. Bin, 3 ft. in diameter by 6 ft. in height. (Grinding bin.) Locally fabricated.

21. Merchen scale feeder 9 in. belt, 5 ft. long, 2 ft. wide, 30 in. in height (W.T.).

22. Rotary valve with drive (Pneumatic conveying)—KICE.

23. Collector (Pneumatic conveying)—KICE.

24. 100-bu. Wolf washer, 4 ft. wide by 10 ft. long by 6 ft. high—SMICO.

25. Steam cylinder, 9 in. diameter by 10 ft. length. (2 HP)—MIDWEST SUPPLY.

26. Airlock with drive (Pneumatic conveying)—KICE.

28. Tempering conveyor — A. Top conveyor 6 in. diameter by 10 ft. long. B. Bottom tempering conveyor 6 in. diameter by 10 ft. long, 3 HP—STRONG-SCOTT.

29. Eight 30-bu. tempering bins, 2 ft. diameter by 12 ft. high.

30. Brush machine 4 ft. by 4 ft. by 5 ft., 5 HP—ROBINSON LTD.

31. Airlock with drive (Pneumatic conveying)—KICE.

32. Collector (Pneumatic conveying)—KICE.

33. Suction type. SMICO No. 84AC10 capacity 6900 CFM at 10 to 1 air ratio, width 5 ft. 1½ in., with pressure blower width 7 ft. 2⅞ in., length 15 ft. 7 in., height 13 ft. 4 in., HP 7½ on pressure blower for rings. —SMICO DAY CO.

34. Dust collecting fan plus motor.

NOTE: Motors will be furnished with some of the equipment.

Robert M. Johnson Appointed to Fuller Foreign Sales Post

CATASAUQUA, PA.—The appointment of Robert M. Johnson as assistant manager of its foreign sales division has been announced by officials of Fuller Co. Mr. Johnson has assumed his new duties.

An administrative assistant within the Fuller organization for the past ten years, Mr. Johnson has a thorough knowledge of the line of process equipment and pneumatic conveying systems designed and manufactured by this firm. In his new post, he will be responsible for coordination of foreign sales effort.

Prior to being named an administrative assistant to Fuller Co. in 1949, Mr. Johnson was from 1936 associated with Separation Process Co. in Catasauqua, at that time a Fuller subsidiary. Time out from these duties was given to the U.S. Navy during World War II.

He is a member of the American Institute of Mining, Metallurgical and Petroleum Engineers; manager and section delegate of the Lehigh Valley Section of AIME; the Engineers Club of the Lehigh Valley, and first vice president of the Industrial Management Club of Allentown and Vicinity.

Mr. Johnson is a resident of Allentown, Pa.

—BREAD IS THE STAFF OF LIFE—

Owens-Illinois Plans Plastic Shipping Sack

TOLEDO — Owens-Illinois Glass Co. announced it will begin production th's year of a heavy duty plastic shipping sack for industrial and agricultural products.

Manufacture and sales of the polyethylene-based sack will be handled by O-I's multiwall bag division, which produces multiwall paper bags for the shipment of similar products.

D. A. Harrington

JOINS DAY SALES CO.—Appointment of D. A. Harrington to the Kansas City office of the Day Sales Co., Minneapolis, has been announced by Max R. Springer, president. Mr. Harrington has 10 years of sales and engineering experience in air handling equipment and related fields. For the past two years he has been a sales engineer for McNamara Sales Co., St. Paul. He previously served in the sales department of Manners-Motz Co., St. Paul, and as a mechanical engineer for the Crane Company of Minnesota. Mr. Harrington will report to F. Neil Leishman, district manager in charge of the Kansas City office, which handles Day sales in Kansas, northern Oklahoma, Nebraska, southern Iowa and the western half of Missouri.

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Eventual Victory in Wheat Smut Fight Indicated in Pacific Northwest Survey

PORTLAND, ORE. — Chances of eventual victory against wheat smut, public enemy No. 1 to Pacific Northwest wheat growers, look pretty bright.

Dr. C. S. Holton, plant pathologist, Pullman, Wash., reported that only .5% of the area's 1959 wheat crop graded smutty.

Dollar toll to growers was about $100,000 compared to $300,000 in 1958 when 2.5% of the crop graded smutty, and $5 million in 1955 when 34% of the crop graded smutty.

Dr. Holton's progress report was presented during a regional extension smut-control committee meeting. The all-day meeting here was attended by U.S. Department of Agriculture and land-grant college plant pathologists and representatives of the trade from Washington, Oregon and Idaho.

In presenting his report, Dr. Holton cautioned growers and the wheat trade against over-optimism for an early, easy victory over the persistent wheat disease. The USDA researcher pointed out that scientists must still lick many problems before permanent smut control can be assured.

Plant pathologists still have much to learn about the smut organism and plant breeders working on improved new varieties will always be faced with the continuing problem of building-in resistance to old and potential new strains of smut, he said.

Dr. Holton's report summarized a survey of the 1959 wheat crop conducted by the Pacific Northwest Grain Dealers Assn. The 1959 survey sampled more than half the wheat produced in Washington, Oregon and northern Idaho, or over 63 million of the 113 million bushels produced.

Dr. Holton's report also summarized annual survey figures since 1955, the peak smut year and turning point in the anti-smut campaign.

He pointed out that the percentage of wheat grading smutty in the PNW area dropped from 34% in 1955 to 26.7% in 1956, and to 16.7% in 1957. Only 2.5% of the crop was smutty in 1958 and .5% in 1959, according to the grain dealers' survey.

Dr. Holton said the two most effective weapons to date in the campaign against the disease were perfected and put into action in the fall of 1955. One was the release of Omar, a highly smut-resistant wheat variety adapted to the Pacific Northwest. The other was the discovery that hexachlorobenzene (HCB), a new chemical, would kill smut spores on the seed and in the soil.

Omar seed for commercial planting, however, did not become generally available until the fall of 1957. Omar comprised 9% of the PNW wheat crop in 1957, 52% in 1958, and 63% in 1959. The new variety was developed by Dr. O. A. Vogel, USDA plant breeder stationed at Washington State University.

Treatment of wheat seed with HCB was developed by the USDA regional smut laboratory at Pullman, headed by Dr. Holton. HCB seed treatment for chemical smut control is now standard procedure by elevators, processors and producers.

Dr. Holton said 30 wheat varieties were included in the 1959 survey Omar, however, comprised 69% of the 1959 Oregon crop sampled, 65% of the Washington crop, and just under 38% of the Idaho crop. Brevor was the leading variety in Idaho.

For perhaps the first time on record, Washington wheat registered the lowest smut percentage in the tri-state area. Only .3% of the crop graded smutty as compared to .8% of the Oregon crop, and 1.5% of the Idaho crop.

Twenty of the 30 varieties included in the survey were smut free, but all 20 were of minor importance in terms of total production.

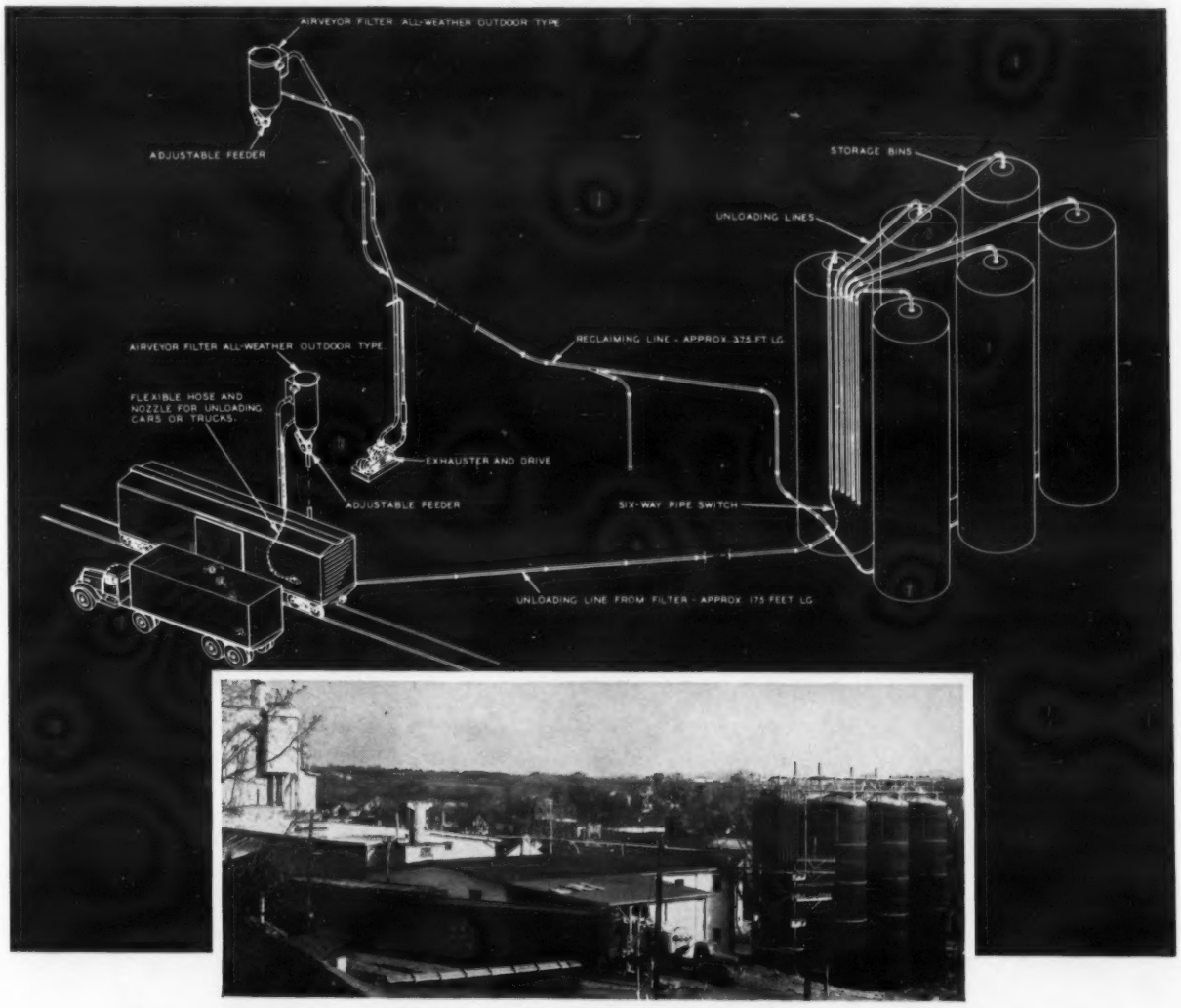
Elmar, representing 1.3% of the survey sample, showed a smut percentage of 7.7%. Rio had a smut percentage of 4.2% and Golden, 3.1%.

Other varieties showing some smut included Omar, .1; Brevor, .7; Elgin, .8; Baart, .2; Federation, .1, and Burt, a trace. Jenkins Club, with only 446 bushels sampled, graded 100% smutty.

Dr. Holton expressed the belief that the Omar that did grade smutty can be discounted to some extent by the region-wide admixtures of Elmar and other smut-susceptible club varieties.

"Although an Omar race of smut is known to be present in the region, no more than a trace of smut has yet been reported on Omar plants of known identity in commercial fields. It seems possible that as the variety mixture problem diminishes, the incidence of smut in Omar might also diminish," Dr. Holton said.

Smut percentages in the seven regional subdivisions of the survey ranged from no smut in the Lind area to 1.8% in the Lewiston area. The Walla Walla sample showed 0.1%; Pendleton, 0.3%; Palouse and Spokane, 0.5%, and The Dalles, 0.8% smutty wheat.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Results—with this new equipment, one mill produces enough feed to allow Brown to use the other three mills for storage and distribution. Production is still increasing and handling costs have been cut up to $3.00 a ton.

In addition to increasing storage space, and reducing unloading time and costs, these systems are self-cleaning, thus minimizing contamination.

If you are now handling dry, bulk, granular materials, it will pay you to look into Fuller pneumatic conveying systems. Fuller systems are engineered specifically for your particular application. They bend around corners, run up or down, through walls and floors, almost any distance—even underground. Write or phone today outlining your problem. Fuller will gladly furnish additional information with appropriate recommendations.

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Nutrition Scientist Recommends L-Lysine Supplementation of World's Cereal Foods

WILMINGTON, DEL. — It is now economically feasible to supplement the world's relatively large supply of cereal foods low in protein quality, with the essential amino acid, L-lysine, and other protein-rich sources, thus converting such products as bread into sources of proteins that are nutritionally equal to the high-quality proteins in meat and milk.

This contention was voiced by Dr. Norman L. Hause, E. I. du Pont de Nemours & Co. scientist, at a recent nutrition conference in the Canary Islands.

Supplementation of bread with a combination of both L-lysine and an additional protein-rich source — soy flour or milk solids, for example — provides a greater improvement in nutritional value than when either L-lysine or a protein-rich source is used alone. L-lysine also has an added advantage as it does not change the taste, texture, or appearance of the supplemented food, the nutrition scientist stated.

Speaking at the conference in Las Palmas, Canary Islands, Dr. Hause urged amino acid supplementation of cereal foods as a practical solution to the limited world supply of high-quality proteins. Even if the supply of high-quality proteins were plentiful, he pointed out, they would be unacceptable to many because of ingrained dietary habits or lack of facilities for handling such foods.

Dr. Hause told the conference, sponsored by the American Soybean Council, that adjustment of the amino acid proportions to those found in high-quality animal proteins is the basic principle of amino acid supplementation of cereal foods. The amino acids, building blocks of protein, are utilized in definite combining proportions for the synthesis of body tissues and serum proteins. High-quality food proteins, he said, contain amino acids in approximately the same proportions in which they are utilized by the body. During digestion, these amino acids are assimilated effectively because they reach the body cells simultaneously in the proper proportions.

Other Amino Acids

In addition to the essential amino acids—essential because they must be present in the diet in the proper proportions to maintain life and growth—other amino acids in the food are also useful to both animals and humans. These amino acids, however, can be synthesized by the body if they are not present in food in adequate amounts. They are therefore called nonessential, he noted.

In many areas where diets are largely based on such cereal foods as wheat, corn, millet and rice, Dr. Hause said it is difficult to obtain a sufficient quantity of protein calories. This problem, he said, can be overcome most effectively by supplementing these foods with high-protein supplements such as milk, wheat gluten, casein, lactalbumin, or soy protein, in amounts that do not interfere with the food's flavor, texture or other physical qualities.

Using these supplementation methods, Dr. Hause said it is relatively easy to raise the level of protein calories in a loaf of bread to 15%, the dietary level many nutrition authorities recommend for children, adolescents and pregnant women. Highly palatable protein breads also can be made providing 20% or more protein calories, a level comparable with milk, ground beef, and many cuts of meat.

Because wheat is a popular world food, much work has been done on the supplementation of this cereal to improve its protein quality. Many studies, according to Dr. Hause, have been carried out with L-lysine supplemented flour, and with bread supplemented with L-lysine, and L-lysine rich products—milk solids, dry yeast, soybean flour, etc. These studies show that in young growing laboratory animals, the protein quality of wheat-based foods, as measured by the protein efficiency ratio (P.E.R.—weight gained divided by weight of protein eaten), is a direct function of the percentage of L-lysine in the total protein. This is true, he said, whether the L-lysine present is in a protein-bound form, or is free L-lysine.

Dr. Hause quoted some of the protein efficiency ratios obtained from studies made in the U.S. with commercially available breads supplemented with milk, wheat gluten, soy flour, or lactalbumin. A standard white bread, supplemented with 3 to 4% non-fat dry milk solids was found to have a P.E.R. of about 1.0, which was raised to about 2.0 by L-lysine supplementation. This indicated that the protein value for growth had been doubled by the addition of this amino acid. Bread made with added soy and milk protein had a P.E.R. of about 1.6, which was brought up to about 2.4 by L-lysine supplementation.

Another bread, which contained milk solids and some soy protein as well as lactalbumin, had a rather high P.E.R. of 1.8. This bread was improved even further with the addition of L-lysine, giving it a P.E.R. of 2.5, an improvement in protein value of more than one third. Dr. Hause said this bread actually de-

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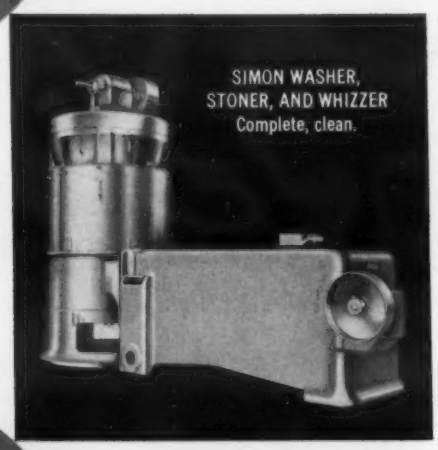
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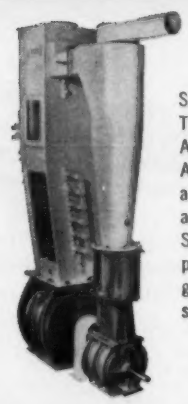
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rived about 40% of its total protein from soy, milk and lactalbumin. The other 60% was from the wheat flour.

Excellent Protein Sources

Dr. Hause emphasized that lactalbumin, non-fat milk solids, casein, and soy, which supply relatively high levels of all the essential amino acids, are excellent sources for raising the protein content of bread. This in turn, he said, furnishes a better base for L-lysine supplementation, leading to a final product higher in protein quantity and quality than if these protein supplements had not been used.

He pointed out, however, that while these supplementation methods improve protein quantity and quality, the improved protein will not be fully available for tissue synthesis and repair unless there are enough food calories in the diet from non-protein sources. If these latter energy calories are not provided in sufficient quantity, some protein is used up as fuel instead of for tissue synthesis.

In conclusion, Dr. Hause said that in a world desperately short of high-quality proteins, supplementation of bread and other cereal foods with L-lysine offers a practical solution that could be quickly and economically applied to alleviate this increasingly serious problem.

——BREAD IS THE STAFF OF LIFE——

MILL BUILDS LABORATORY

KINGMAN, KANSAS — The Consolidated Flour Mills Co. has established its own laboratory to test wheat for moisture, mineral and protein content when it first reaches the mill. Formerly tests were made at another mill.

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Irradiated Flour Proven Harmless In Animal Rations

URBANA, ILL.—Animals fed a ration including irradiated flour show no harmful effects, according to Dr. Elwood F. Reber, University of Illinois College of Veterinary Medicine.

Working under a research grant from the office of the Surgeon General, Dr. Reber subjected wheat flour to a form of atomic energy called gamma radiation. The radiation dosage was greater than was ordinarily needed to destroy weevil and beetle eggs. This relatively high level insured an adequate test of the effects of radiation on the wholesomeness of radiated flour.

Inspections over a two-year period showed that gamma radiation effectively sterilized adult insects and killed insect eggs in the flour. The radiated flour was still wholesome and nutritious.

Mixing radiated flour with non-radiated food, Dr. Reber fed this ration to a group of beagles. The dogs were allowed to eat all they wanted over a 24-week period. Sets of tests conducted on blood and urine samples, in addition to weekly examinations of the animals, indicated that this diet had no harmful effects.

In fact, says Dr. Reber, dogs fed a ration containing radiated flour made slightly higher average weight gains throughout the experimental period than dogs fed a non-radiated ration. In addition, some of the beagles fed radiated flour weighed less at the start of the experiment and ate less during the experiment than some control animals receiving a non-radiated ration. In spite of this fact, they showed slightly higher weight gains, indicating better food conversion of the radiated rations than of the non-radiated.

Southeast Asian nations are seriously considering the use of radiation equipment, manufactured in the U.S., as a means of protecting their stored grain. These nations have not developed large canning or freezing industries. Chemical fumigation has not been practiced for protecting stored flour. Since radiation does not diminish the nutritive value of stored flour, this method of protecting it may get first big-scale use in these countries.

——BREAD IS THE STAFF OF LIFE——

Sprout-Waldron Names William H. Alsted

MUNCY, PA.—The appointment of William H. Alsted as sales representative for northern Idaho, Washington, Oregon and British Columbia has been announced by Sprout, Waldron & Co., Inc. Since Mr. Alsted has been operating in this area as a Sprout-Waldron serviceman, his experience and background not only cover the full line of Sprout-Waldron equipment, but also problems which are peculiar to the area.

Mr. Alsted joined Sprout-Waldron in 1954, after 11 years with the Alsted Manufacturing Co., Truesdell, Wis. After a thorough training in the plant, he was sent into the Chicago district as a serviceman. Early in 1958 he moved to California to handle service problems in that area.

Mr. Alsted studied engineering at the University of Alabama from 1938 to 1942. He then joined the Marines and served in the Pacific Theatre. He plans to set up residence in Portland.

Expanded Research In Corn Announced

NEW YORK — Research in corn and its components, principally starch, will occupy 21 scientists working on grants from Corn Industries Research Foundation, Inc., during 1960.

Trustees of the foundation, at their recent annual meeting here, approved the continuance of existing research studies and authorized several new investigations, in a program totaling $250,000 for the year.

Frank K. Greenwall, newly elected president of the foundation and chairman of the board of National Starch and Chemical Corp., New York, announced the grants-in-aid to universities and other institutions. He attributed much of the progress of the corn refining industry to the findings of basic research in the past.

The foundation's research program, now in its 26th year, supplements the research efforts of the individual corn refining companies and is administered by an industry-wide committee of company scientists.

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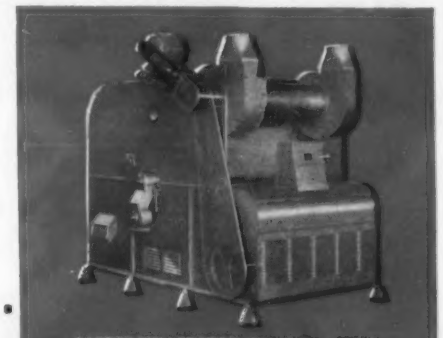

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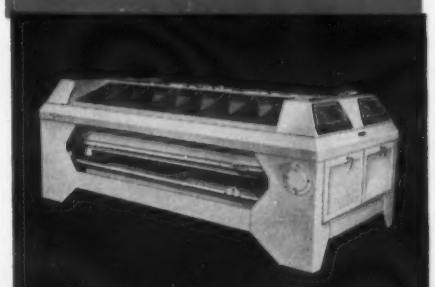

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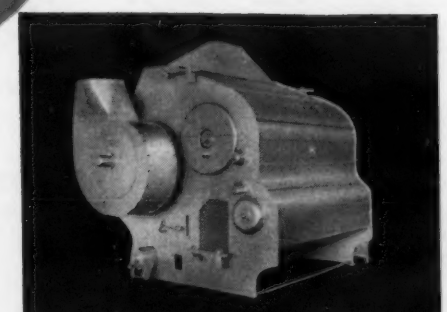

CARTER SCALPERATOR. The high capacity, all-rotary-motion machine for scalping and aspirating grains as received and in process.

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Economical, effective, trouble-free spot fumigation is assured by our national reputation. We are the original developer of Dawson 73 Low Dosage Spot Fumigant (U.S. Patent No. 2,606,857). We serve a large percentage of the milling capacity in America today. Their own experience with our materials is a further assurance. Inquiries invited. We are a trained, experienced service organization dedicated to helping you get the best results at the most economical cost.

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SCHUMACHER

(Continued from page 1a)

flour mill. The advantages of water-cooling are as follows:

1. Prevention of condensation;
2. Elimination of, or reduction of, moth trouble;
3. Control over evaporative loss;
4. Advantage of sacking of products at cooler temperature;
5. Increased dressing efficiency.

It is impossible to express any of these advantages in money. The main benefit to the miller will undoubtedly be greater regularity of results.

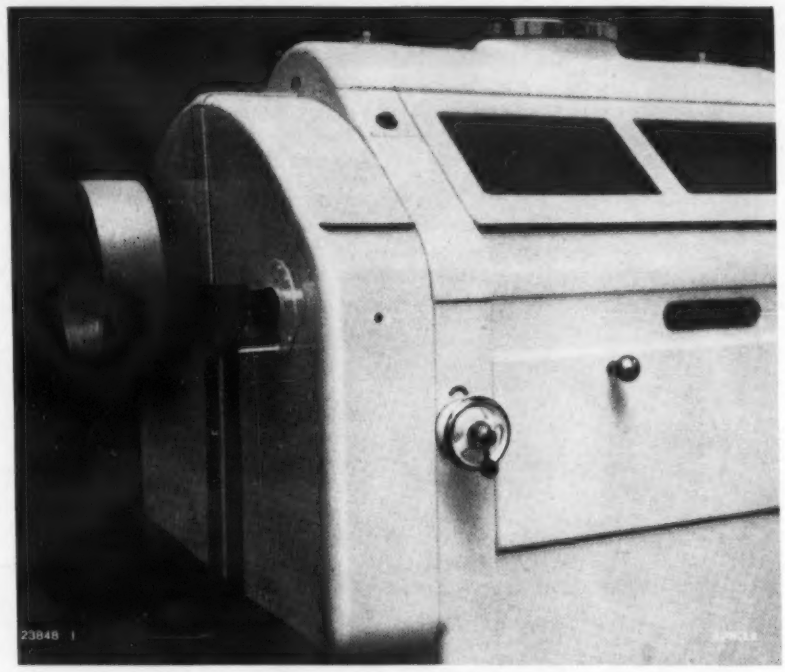
Water-cooling of the grinding rolls is particularly important, especially for short roll surfaces and high revolutions. The temperature is reduced and kept constant. Low roll temperature means cooler grinding; constant temperature insures unchanged setting of rolls and more uniform results. Providing a mill, with water-cooled rolls, is checked properly and all rolls are cooled as required, it can then be said that the whole milling system is less sensitive against weather changes. Let's consider a mill building in summer with a temperature of 68° F. The heavily loaded rolls, cooled with such air will maintain a working temperature of 100-120° F. In winter, the mercury drops to 10-20° F. Rolls cooled with this air will maintain a working temperature between 50-70° F. As already mentioned before, the air temperature changes as often as the atmospheric conditions change. This has a negative effect, especially on the purifiers.

At the same time, the Dew Point of the aspiration air changes after it has absorbed a part of the grinding heat. Due to this circumstance, the moisture content in the stock is steadily lowered. This does not happen with the small amount of aspiration air with water-cooled rolls because there is no heat available. Even the heavily loaded rolls in summer, which are water-cooled, operate with a temperature on which the aspiration air is cooled; the Dew Point changes. However, the air gives moisture to the stock instead of extracting it.

The operating temperature in water-cooled rolls changes very little from summer to winter because the cooling water changes only a few degrees. We recommend using a larger amount of water, but warmer (approximately 64-68° F.) instead of less water which is very cold. This is accomplished by using a part of the water coming from the rolls mixed with fresh water. The surplus water can very well be used for wheat washing. Due to the fact that the Dew Point inside the rolls changes only slightly because the aspiration air in water-cooled rolls does not warm (contrary, it is cooled), the evaporation loss becomes very small. Should it be necessary for some reason to grind dry, one could even expect a gain in stock.

With no change of relative humidity of the aspiration air, there is no change in sifting efficiency visible. There will be no need to set the purifiers every so often.

With a grinding system in which we can regulate the operating temperature and in which the aspiration air could be adjusted to the temperature of the stock, we can say that a big step forward in controlling the grinding has been accomplished.



The connecting head of the water cooling device, shown in black at the left of the picture, can be withdrawn from the end of the shaft by a simple grasp. No other dismantling on the water cooling unit is required when changing the roll.

MDCCCLXXXV PK MCMLX

ANNO LXXV

Quality is the only sure foundation on which to build a business. In bag making it is the sum of many perfected details, in design, in printing and in workmanship.

To make PK the recognized symbol of quality in our field, has been our endeavor through the years.

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always something new!

If your flour treatment doesn't start like this...

Here's what you're missing...

You're missing the greater accuracy, uniformity and economy which only HY-KURE® can provide in maturing and bleaching flour.

HY-KURE starts its flour treatment with the immersion of exclusive Blockette . . . (illustration) . . . ClO_2 in solid, frozen form . . . in plain tap water.

From pre-controlled solution to accurate ClO_2 gas to precise metering to individual agitators, HY-KURE provides automatic, trouble-free operation. Eliminates (1) dangers and difficulties with ClO_2 components, (2) the old gas generator, (3) the need to watch, check, reset meter controls.

And HY-KURE can be installed in your plant without interruption in your flour production.

Good reason why more and more millers are switching to HY-KURE every year. Get the facts . . . without obligation of course . . .

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SPECIALISTS IN FLOUR MATURING, BLEACHING AND ENRICHMENT

U.S. Pat. Nos. 2,683,651—2,740,690—2,837,414

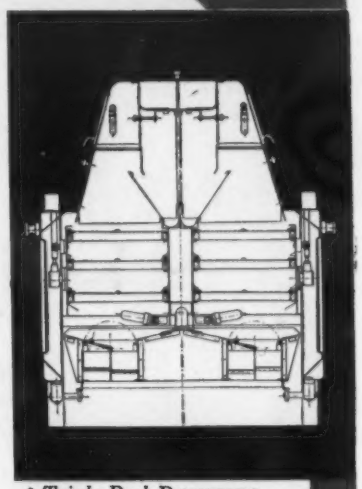
"Triple-Deck Purifiers give us lowest fragment count" *(says Superintendent of large milling firm)*

"Since we changed to BUHLER *Triple-Deck* PURIFIERS in one of our mills, its flour has fewer insect fragments than that from any of our other plants," says the superintendent of one of North America's largest milling firms.

Yes . . . and there's a good reason, because lighter particles are stratified on the top sieve where they are carried away by air or tailed over. Thus, the two lower sieves have clean products.

And here are just a few of the *other* important advantages you get when you switch to BUHLER *Triple-Deck* PURIFIERS.

- Highest percentage of clean, low-ash middlings . . . because middlings are classified by quality as well as size . . . and because the sub-divided air-hood with individual covers above each sieve give unequalled accuracy of air control.
- No need for re-purification under normal conditions. With 3 decks, a single pass does the job.
- Three decks of sieves permit more separations than is possible with 1 or 2-deck purifiers.
- Sieve cleaning is completely automatic and trouble-free. Frames are equipped with silk-tightening device.
- Flow fluctuations caused by changes in wheat quality are easily seen and corrected. Sieves are interchangeable while machine is running.
- Dependable operation and less maintenance because fewer moving parts than any other purifier. Simple BUHLER drive needs only ½ hp.
- Oscillating troughs convey purified stock gently with no attrition of flour.
- Easy to install and operate.



Triple-Deck PURIFIERS such as the Model MQRC shown here, were developed and are manufactured *only* by BUHLER.

Like more information on how these Purifiers have often paid for themselves in less than a year? Then write today.

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